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PATENT SPECIFICATION



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480,364

One Complete Specification Left: Aug. 27, 1937.

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Specification Accepted: Feb. 22, 1938.

PROVISIONAL SPECIFICATION

No. 23519 A.D. 1936.

Improvements in and relating to Spring Loaded Door Handles or Knobs

We, HAROLD GILBERT RAMSEY, a British subject, of Alverley, York Gardens, Wolverhampton, in the County of Stafford, and JACK WILLIAM TAYLOR, a 5 British subject of "Kingswear" Church Hill Road, Tettenhall, in the County of Stafford, do hereby declare the nature of this invention to be as follows:—

This invention relates to spring loaded 10 door handles or knobs for operating door latches and the like.

Usually spring loaded door handles or knobs are adapted for use only with either a right hand or a left hand door and 15 therefore spring loaded handles for both right and left hand doors have to be stocked by the manufacturers and retailers and before supplying fittings it is necessary to determine the hand of the 20 particular doors for which the devices are required.

An object of the invention is therefore to provide a spring loaded door handle or knob which is readily adaptable for either 25 a right hand or a left hand door.

Another object of the invention is to provide a reversible spring loaded door handle or knob which can be manufactured at low cost.

According to the invention a member 30 rotatable with the door handle or knob and engaging one end of a loading spring is limited in its movements by a stop which is adjustable or removable to permit 35 movement of said member into a position in which the action of the spring and the handle or knob are reversed thereby converting the spring loaded handle or knob from a right hand to a left hand or vice 40 versa.

Also according to the invention a reversible spring loaded door handle or knob is provided in which one end of a loading spring is engaged with an abutment while 45 the other end of the spring is engaged by a member rotatable with the handle or knob and limited in its movements by a stop which is adjustable or removable so

as to permit movement of the member and handle into a position in which the end of the spring previously engaged by the abutment is engaged by said member 50 while the opposite end of the spring previously engaged by the member is engaged by the abutment in opposite sense. 55

The spring may be of coil form and located in an annular housing which may carry the adjustable or removable stop and which may be adapted for securing to the door or may be secured to or formed 60 integral with a plate adapted to be secured to the door.

The member rotatable with the door handle or knob may be in the form of a circular plate having a pair of arcuate 65 recesses or slots which alternatively co-operate with the stop according to the sense of the adjustment.

In carrying the invention into effect according to one convenient mode as 70 applied by way of example to a spring loaded lever handle, a plate member adapted to be secured to a door is provided on its inner side with an annular housing comprising two concentric annular flanges 75 in the channel between which a coiled spring is located. This housing may be formed integral with the plate or may be a separate member secured to the plate in a suitable manner. One or both of the 80 annular flanges is provided with a lug projecting inwardly of the channel, such lug, or lugs, forming a stop or fixed abutment for an end of the spring which is preferably of such length that it is under 85 compression when in position in the channel. The lever handle has a flange portion bearing on the face of the plate and has a sleeve portion passing through an aperture in the plate and bearing in the 90 inner one of the annular flanges forming the spring housing. This sleeve portion of the lever handle projects beyond the spring housing and has a reduced end, preferably squared, carrying a rotary 95 member which is secured to the reduced

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end, such as by rivetting or forming over the latter, for movement with the handle. The hollow interior of the sleeve portion is square in cross-section for reception of 5 the spindle of the door latch or the like. The rotary member, which is in the form of a circular plate of substantially the same diameter as the spring housing, engages with or is in close proximity to 10 the inner face of the spring housing and thereby prevents axial movement and removal of the lever handle. Provided on the rotary member is a driving member consisting of a lug which projects 15 into the channel of the spring housing and engages one end of the spring and this rotary member is also provided with two spaced peripheral recesses or cut away portions of segmental shape each recess 20 extending over an arc corresponding with the desired arc of movement of the lever handle. Co-operating with the rotary member and engageable in one or other of the peripheral recesses thereof is a stop 25 member removably or adjustably secured to the outer flange of the spring housing. This stop member may consist of a screw engaging a tapped hole in a lug formed on the spring housing.

30 Assuming the spring loaded lever handle described above is in left hand position the lever is resiliently held in horizontal position and clockwise movement thereof from this horizontal position 35 is prevented by the spring acting on the driving lug of the rotary member and maintaining the end of one of the peripheral recesses of the latter against the stop of the spring housing. Counter- 40 clockwise movement of the lever handle from the horizontal position for the purpose of releasing the door latch or the like is permitted against the action of the spring, the amount of movement, which 45 may be approximately 45° , being determined by the length of the peripheral recess in the rotary member which operates with the stop.

To reverse the lever handle, or to 50 convert it from a left hand position to a right hand position, the stop of the spring housing is adjusted or removed from the path of movement of the rotary member and the handle is rotated in a clockwise 55 direction through an angle of 180° so as

to bring it again into horizontal position but extending in the opposite direction. This movement of the lever handle effects movement of the rotary member a corresponding amount and brings the second 60 peripheral recess of the latter into position for co-operation with the stop which is thereupon readjusted or replaced. During the movement referred to the end of the spring which was previously in engagement with the driving member is engaged by the lugs or abutments of the housing and the driving member engages the other end of the spring which was previously 65 engaging the lugs or abutments. Thus, 70 the action of the spring and the operative movement of the lever handle is reversed, the handle now being movable from its reversed horizontal position in a clockwise direction against the action of the 75 spring to effect release of the latch or the like, the operative movement being determined or limited by the length of the second peripheral recess in the rotary member in co-operation with the adjustable or removable stop.

Instead of the spring housing being secured to the plate member, this housing with its associated parts may be arranged 80 separate from the plate member. According to such arrangement the spring housing may be secured to the face of the door, or in a recess in the face of the door, by screws one of which may form the adjustable or removable stop previously referred to for co-operation with the rotary member. The lever handle in this case 85 may be secured to and bear in the plate member while the rotary member may be secured for rotary movement with the 90 handle by means of a square spindle engaging a square aperture in the rotary member and a square recess in the handle. Such spindle may be the operating spindle 95 for the door latch or the like. This modified construction would operate and be reversible in the manner previously described.

It is obvious that the arrangements described for spring loading lever handles 100 and permitting ready reversal thereof may be applied to door knobs.

Dated this 27th day of August, 1936.
MARKS & CLERK.

PROVISIONAL SPECIFICATION
No. 30118 A.D. 1936.

Improvements in and relating to Spring Loaded Door Handles or Knobs

We, HAROLD GILBERT RAMSELL, a British subject, of Alverley, York Gar-

dens, Wolverhampton, in the county of Stafford, and JACK WILLIAM TAYLOR, a

British subject, of " Kingswear," Church Hill Road, Tettenhall, in the County of Stafford, do hereby declare the nature of this invention to be as follows:—

5 This invention relates to spring loaded door handles or knobs for operating door latches and the like.

Spring loaded door handles or knobs are usually adapted for either right or left hand operation thus necessitating manufacturers and retailers having to stock both types and before supplying fittings making it necessary to determine the hand of the particular door for which the 15 fittings are required.

An object of the present invention is to provide an improved spring loading for door or like handles by which the handle may be turned both to the right or left.

20 A further object is to provide a spring loaded door handle or knob, operable in either direction, which can be manufactured at low cost.

According to the invention a member 25 rotatable with the door handle or knob is engageable with either end of an annular spring, the other end of the spring being engageable with an abutment according to the direction of operative movement 30 of the door handle or knob.

The improved spring loading means may form a unitary structure with the rose fitting or plate for the handle or knob preferably being located on the inner side 35 of such fitting.

Alternatively the spring loading means may comprise a separate unit adapted to be mounted upon the face of the door or with a recessed portion thereof.

40 In carrying the invention into effect according to one convenient mode, as applied to the inner face of the rose fitting or plate an annular housing is provided comprising concentric flanges or walls 45 which form a guiding groove for a coiled spring which assumes an annular form. The flanges or walls are arranged concentric with the axis of a handle or knob, the inner wall, in fact forming a bearing 50 for the shank or shaft of the handle or knob.

Projecting into the groove between the flanges is a pair of opposed abutments against which the ends of the spring are

adapted to seat. The abutments are spaced 55 radially to provide a concentric arcuate opening into which a projection or detent associated with the handle or knob is adapted to enter so that it lies between the ends of the springs. 60

Conveniently the projection or detent is formed upon a covering plate which is mounted upon the inner end of the shank of the handle.

The cover plate is provided with a 65 square hole into which a square portion of the shank enters, the cover plate being fixed in position by rivetting over. The handle is provided with a square hole to receive the square spindle of the latch or 70 lock.

The circumferential extent of the detent is preferably slightly greater than that of the abutments so that when the handle is in its normal position both ends of the 75 spring will engage the detent and thus avoid rattling of the handle.

In operation, on the handle being turned in either direction, the projections on the cover plate will be rotated engaging one 80 end of the spring, the other end of which will engage the abutments whereby the spring will be compressed.

Instead of the flanges being formed integrally with the rose fitting, a unit 85 may be provided comprising a barrel or casing for the spring, adapted to be fixed upon the inner surface of either the rose fitting or the face of the door or a recess therein. When fixed to the door an opera- 90 tive connection between the handle and the cover plate carrying the detent is provided by the square spindle of the lock or latch.

According to a further arrangement, the 95 flanges forming the guiding groove for the spring may be provided on the outer face of the rod fitting, the cover plate in such case being formed as a flange on the exterior part of the handle shank; or 100 again the handle may be provided with a bossed part in which the spring groove is formed, the projection or detent then being located on the outer face of the rose fitting or plate. 105

Dated this 5th day of November 1936.
MARKS & CLERK.

COMPLETE SPECIFICATION

Improvements in and relating to Spring Loaded Door Handles or Knobs

We, HAROLD GILBERT RAMSELL, a British subject, of Alverley, York Gardens, Wolverhampton, in the county of Stafford, and JACK WILLIAM TAYLOR, a

British subject, of " Kingswear," Church 110 Hill Road, Tettenhall, in the County of Stafford, do hereby declare the nature of this invention and in what manner the

same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to spring loaded door handles or knobs for operating door latches and the like.

Usually spring loaded door handles or knobs are adapted for use only with either a right hand or a left hand door and therefore for spring loaded handles for both right and left hand doors have to be stocked by the manufacturers and retailers and before supplying fittings it is necessary to determine the hand of the particular doors for which the devices are required.

An object of the invention is therefore to provide a spring loaded door handle or knob which is readily adaptable for either a right hand or a left hand door.

Another object of the invention is to provide a reversible spring loaded door handle or knob which can be manufactured at low cost.

According to the invention a member rotatable with the door handle or knob and engaging one end of a loading spring is limited in its movements by a stop which is adjustable or removable to permit a rotary movement of said member into a position in which the action of the spring and the handle or knob are reversed thereby converting the spring loaded handle or knob from a right hand to a left hand or vice versa.

Also according to the invention a reversible spring loaded door handle or knob is provided in which one end of a loading spring is engaged with an abutment while the other end of the spring is engaged by a member rotatable with the handle or knob and limited in its movements by a stop which is adjustable or removable so as to permit movement of the member and handle into a position in which the end of the spring previously engaged by the abutment is engaged by said member while the opposite end of the spring previously engaged by the member is engaged by the abutment in opposite sense.

The spring may be of coil form and located in an annular housing which may carry the adjustable or removable stop and which may be adapted for securing to the door or may be secured to or formed integral with a plate adapted to be secured to the door.

The member rotatable with the door handle or knob may be in the form of a circular plate having a pair of arcuate recesses or slots which alternatively cooperate with the stop according to the sense of the adjustment.

According to a modification in which the door knob is movable in both directions, a member is provided connected to

the knob and adapted for engagement with either end of a spring, the other end of the spring engaging a fixed abutment.

Further features of the invention will be hereinafter described and defined in the claims.

In the accompanying drawings:—

Figures 1, 2 and 3 are views of one form of spring loading for the handle.

Figures 4 and 5 are views of a modified form comprising an independent unit.

Figures 6, 7 and 8 are views of a further modification.

Figures 9 to 12 are views of another form of the invention.

Figures 13, 14 and 15 are views of a further arrangement, while

Figures 16 to 18 are views of another modification.

In carrying the invention into effect according to one convenient mode as applied by way of example to a spring loaded lever handle, a dished plate member or rose 1 adapted to be secured to a door is provided on its inner side with an annular housing comprising two concentric annular flanges 2, 3 in the channel between which a coiled spring 4 is located. This housing may be formed integral with the plate as shown or may be a separate member secured to the plate in a suitable manner. The annular flanges 2, 3 are provided with lugs 5, 6 projecting inwardly of the channel, such lugs forming a stop or fixed abutment for an end of the spring 4 which is preferably of such length that it is under compression when in position in the channel. The lever handle 7 has a flange portion 8 bearing on the outer face of the plate 1 and has a sleeve portion 9 passing through an aperture in the plate and bearing in the inner annular flange 2. This sleeve portion 9 of the lever handle projects beyond the spring housing and has a reduced end, squared or provided with flats and carrying a rotary member 10 which is secured to the reduced end (such as by riveting or forming over of the latter) for movement with the handle. The hollow interior 11 of the sleeve portion 7, 9 is square in cross-section for reception of the spindle of the door latch or the like. The rotary member 10, which is generally a circular plate of substantially the same diameter as the spring housing, engages with or is in close proximity to the inner face of the spring housing and thereby prevents axial movement and removal of the lever handle. Provided on the rotary member 10 is a driving member consisting of a lug 12 which projects into the channel of the spring housing and engages one end of the spring 4. The rotary member is also provided with two spaced peripheral recesses

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or cut away portions 13, 14 of segmental shape each recess extending over an arc corresponding with the desired arc of movement of the lever handle. Co-
5 operating with the rotary member and engageable in one or other of the peripheral recesses thereof is a stop member removably or adjustably secured to the plate 1 adjacent the outer flange 3 of the
10 spring housing. This stop member may consist of a screw 15 engaging a tapped hole in a projection formed adjacent the spring housing.

Assuming the spring loaded lever
15 handle described above is in left hand position the lever is resiliently held in horizontal position and clockwise movement thereof from this horizontal position is prevented by the spring 4 acting
20 on the driving lug 12 of the rotary member 10 and maintaining the end of the appropriate peripheral recesses 13 or 14 against the stop 15 of the spring housing.
25 Counterclockwise movement of the lever handle from the horizontal position for the purpose of releasing the door latch or the like is permitted against the action of the spring, the amount of movement, which may be approximately 60°, being
30 determined by the length of the peripheral recess.

To reverse the lever handle, or to convert it from a left hand position to a right hand position, the stop 15 is removed from
35 the path of movement of the rotary member 10 and the handle is rotated in a clockwise direction through an angle of 180° so as to bring it again into horizontal position but extending in the opposite
40 direction. This movement of the lever handle effects movement of the rotary member a corresponding amount and brings the other peripheral recess into position for co-operation with the stop 15
45 which is thereupon replaced. During the movement referred to the end of the spring 4 which was previously in engagement with the driving member 12 is engaged by the lugs or abutments 5, 6 of the housing and the driving member which passes
50 the lugs in the reversing movement engages the other end of the spring which was previously engaging the lugs or abutments. Thus, the action of the spring
55 and the operative movement of the lever handle is reversed, the handle now being movable from its reversed horizontal position in a clockwise direction against the action of the spring to effect release of the latch or the like, the operative movement being determined or limited by the length
60 of the second peripheral recess in the rotary member now co-operating with the stop 15. Instead of a pair of lugs or pro-
65 jections 5, 6, only one may be provided.

Instead of the spring housing being secured to the plate member, this housing with its associated parts may be arranged separate from the plate member. According to such arrangement, see Figures 4 and 5, the spring housing 16 may be secured to the face of the door, or as shown in a recess in the face of the door, by screws 17, 18 one of which, 17, may form the adjustable or removable stop previously referred to for co-operation with the rotary member 10. The lever handle 18 in this case may be secured to and bear in the plate member or rose 19 while the rotary member 10 may be secured for rotary movement with the handle by means of a square spindle 20 engaging a square aperture 21 in the rotary member and a square recess 22 in the handle. Such spindle may be the operating spindle for the door latch or the like. This modified construction would operate and be reversible in the manner previously described.

It is obvious that the arrangements described for spring loading lever handles and permitting ready reversal thereof may be applied to door knobs.

According to a modification (see Figures 6, 7 and 8) the stop for limiting the movement of the handle instead of being applied to the rose in the form of the screw 16 may comprise a removable screw 33 which is mounted on the rotary plate member 34 which is fixed upon the handle. The screw 33 projects from the plate member 34 and is adapted to move in spaces between projections 35 and 36 or 36 and 37, according to whether the handle is arranged for right or left. These projections 35, 36 105 and 37 are formed on the rose or plate fitting and comprise recessed portions of the outer wall 38 of the spring housing. The projection 35 extends into the spring space in the housing and has a co-operating projection 39 spaced therefrom and forming abutments for the ends of the spring. The rotary plate 34 is provided with a driving lug 40.

Instead of the removable screw, such as 16 in Figure 2, a radially slid able stop may be provided of angular form and adapted to slide in guides on the rose or plate fitting. This slideable stop may be so arranged that in normal operation it occupies a position acting as a stop for the rotary plate but when it is desired to reverse the hand of the handle it may be raised to permit passage of the driving lug on the plate.

Instead of a sliding stop a pivoted stop may be provided and such may pivot on an axis of the plane of the plate or rose or at right angles thereto.

According to a further form, see 130

Figures 9 to 12, the housing for the spring may comprise a box-like member 40 which is fixed upon the inner end of the handle 41. This box 40 is provided with peripheral projections 42 adapted to form the stop elements for engagement with the screw stop member 43 which is fixed to the plate or rose 44. In this case the abutments for the ends of the spring are provided on the rose or plate 44 and comprise a pair of projections 45, 46 (Figure 11) which are arranged concentric with the axis of the handle. The driving lug 47 is located on the box-like housing.

According to a further modification, see Figures 13 to 15, the housing 48 for the spring is arranged integral with the handle 49 and an abutment for one end of the spring is provided by a projection 50 on the rose or plate 51, while the other end of the spring 52 is adapted to abut against a removable stub screw 53 carried in the housing. The stop member comprises a plate 54 riveted upon the handle 25 and co-operating with a removable screw 55 fixed in the rose or plate at the rear thereof. When it is desire to reverse the handle the screw 53 is removed and the handle partly turned so that the screw 30 may be replaced in a tapped hole 56 spaced at 180°. At the same time the stop screw 55 is removed so that the handle may be turned the desired amount and then replaced to engage in an appropriate recess 85 in the plate member 54. The spring will then operate on the opposite side of the stop 50 to that shown in Figure 13.

While the stop screws have been referred to as being removed for reversing the hand, this is not essential as the head of the screw may be provided with a diametral projection whereby on turning the screw 90° the projections on the rotary plate may pass the diametral projection 45 on the screw.

According to another arrangement as applied to a spring loaded door knob, the spring loading may be such that the handle may be turned both to the right 50 and left.

Thus referring to Figures 16, 17 and 18, in the application of this part of the invention to the inner face of the rose fitting or plate 23 an annular housing is provided comprising concentric flanges or walls 24, 25 which form a guiding groove for a coiled spring 26 which assumes an annular form. The flanges or walls 24, 25 are arranged concentric with the axis of a handle or knob 27, the inner wall 25 in fact forming a bearing for the shank or shaft 28 of the handle or knob.

Projecting into the groove between the flanges is a pair of opposed abutments 29, 30 against which the ends of the spring

are adapted to seat. The abutments are spaced radially to provide a concentric arcuate opening into which a projection or detent 31 associated with the handle or knob is adapted to enter so that it lies between the ends of the springs, see Figure 18.

Conveniently the projection or detent 31 is formed upon a covering plate 32 which is mounted upon the inner end of the shank of the handle.

The cover plate is provided with a shaped hole 33 into which a correspondingly shaped portion of the shank 28 enters, the cover plate being fixed in position by riveting over. The handle is provided with a square or angular hole 34 to receive the square or angular spindle of the latch or lock.

The circumferential extent of the detent 31 is preferably slightly greater than that of the abutments 29, 30 so that when the handle is in its normal position as shown in Figure 17 both ends of the spring 26 will engage the detent and thus avoid rattling of the handle.

In operation, on the handle 27 being turned in either direction, the projection 31 on the cover plate 32 will be rotated engaging one end of the spring, the other end of which will engage the abutments 29, 30 whereby the spring will be compressed.

Instead of the flanges being formed integrally with the rose fitting, a unit may be provided comprising a barrel or casing for the spring, adapted to be fixed upon the inner surface of either the rose fitting or the face of the door or a recess therein. When fixed to the door an operative connection between the handle and the cover plate carrying the detent is provided by the square spindle of the lock or latch.

According to a further arrangement, the flanges forming the guiding groove for the spring may be provided on the outer face of the rod fitting, the cover plate in such case being formed as a flange on the exterior part of the handle shank; or again the handle may be provided with a bossed part in which the spring groove is formed, the projection or detent then being located on the outer face of the rose fitting or plate.

The driving member for the spring, 120 instead of being carried by the rotary member, such as 10, may be fitted to or formed integral with the handle. For example, the spring housing may be provided on one face thereof with a stop for 125 the rotary member as in arrangements previously described but the handle or a flange thereof may have the driving member in the form of a lug integral therewith and projecting into the spring hous-

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ing for co-operation with the spring.

Having now particularly described and ascertained the nature of our said invention and in what manner the same is to be performed, we declare that what we claim is:—

1. A spring loaded door handle comprising a member rotatable with the door handle and engaging one end of a loading 10 spring, said member being limited in its movements by a stop which is adjustable or removable to permit a rotary movement of said member to a position in which the action of the spring and the handle are 15 reversed.

2. A reversible spring loaded door handle wherein one end of a loading spring engages a fixed abutment while the other 20 engages a member rotatable with the handle, said member being limited in its movements by a stop which is adjustable or removable so as to permit movement of the member and handle to a position in which the end of the spring previously 25 engaged by the abutment is engaged by said member while the opposite end of the spring previously engaged by the member is engaged by the abutment.

3. A spring loaded door handle as 30 claimed in Claim 1 or 2 wherein the spring is of coil form and is located in an annular housing on which the adjustable or removable stop is mounted, said housing being formed in one with a plate or rose on 35 which the handle is mounted or formed as a separate unit adapted to be mounted at the rear of the plate or rose or on the face of the door or in a recess thereof.

4. A spring loaded door handle as 40 claimed in Claim 1, 2 or 3 wherein the member rotatable with the door handle comprises a circular plate having a pair of peripheral recesses adapted alternately to co-operate with the stop according to 45 the sense of the adjustment, said plate having a lug for engaging the spring.

5. A spring loaded door handle as 50 claimed in Claim 4 wherein one or a pair of oppositely disposed projections are provided in the housing and form an abutment for the spring, said projection or projections being located so that the lug may pass when the "hand" of the handle is being adjusted.

55 6. A spring loaded door handle as claimed in Claim 1 or 2 wherein the spring is of coil form and is located in an annular housing formed on a plate or rose supporting the handle, said housing having peripheral recesses adapted alternately to 60 cooperate with the stop which is mounted upon members rotatable with the door handle.

7. A spring loaded door handle as 65 claimed in Claim 1 or 2 wherein the spring

is of coil form and is located in a housing secured upon the handle, said housing having peripheral recesses adapted alternately to co-operate with the stop which is mounted upon a plate or rose for the handle, said plate having an abutment or abutments for the spring, and said housing having a lug for engaging and driving the spring.

8. A spring loaded door handle as 70 claimed in Claim 1 or 2 wherein the spring is of coil form and is located in a housing formed on the handle, said housing having diametrical opposed tapped holes for a screw adapted to engage and drive the 75 spring against an abutment formed on a plate or rose, the handle carrying a stop plate having a pair of peripheral recesses adapted for alternately engaging with a removable stop in the rose or plate.

9. A spring loaded door handle 80 rotatable in either direction and having a member adapted for engagement with either end of a spring, the other end of which engages a fixed abutment.

10. A spring loaded door handle as 85 claimed in Claim 9 wherein the spring is of coil form and is located in an annular housing having the fixed abutment, the member for driving the spring projecting into the housing and being secured upon the handle and being located to pass the fixed abutment upon turning the handle.

11. A spring loaded door handle as 90 claimed in Claim 10 wherein the rotary member secured to the handle comprises a disc or cover for the annular housing.

12. A spring loaded door handle as 95 claimed in Claim 10 or 11 wherein the housing is formed integral with a rose or plate, or independent thereof for attachment to the plate or to the face of the door in a recess therein.

13. A spring loaded door handle substantially as described with reference to Figures 1, 2 and 3 of the accompanying drawings.

14. A spring loaded door handle substantially as described with reference to Figures 4 and 5 of the accompanying drawings.

15. A spring loaded door handle substantially as described with reference to Figures 6, 7 and 8 of the accompanying drawings.

16. A spring loaded door handle substantially as described with reference to Figures 9, 10, 11 and 12 of the accompanying drawings.

17. A spring loaded door handle substantially as described with reference to Figures 13, 14 and 15 of the accompanying drawings.

18. A spring loaded door handle substantially as described with reference to

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Figures 16, 17 and 18 of the accompanying drawings. Dated this 27th day of August, 1887.
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Leamington Spa: Printed for His Majesty's Stationery Office, by the Courier Press.—1888.

[This Drawing is a reproduction of the Original on a reduced scale.]

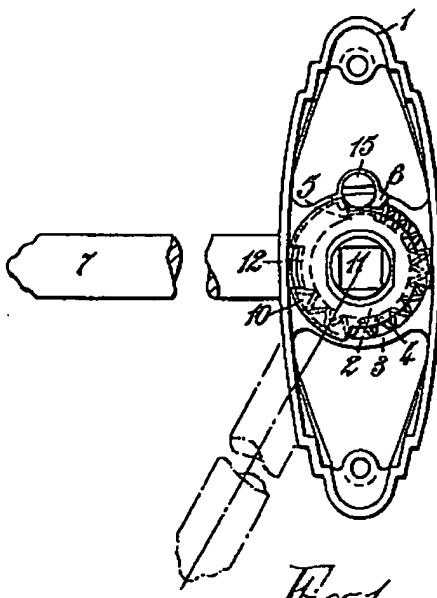
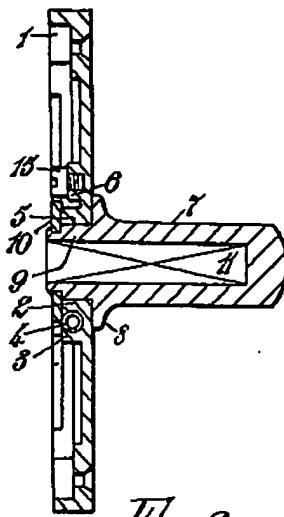


Fig. 1.



SHEET 1

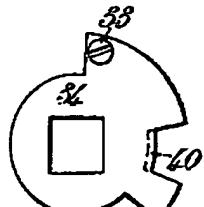
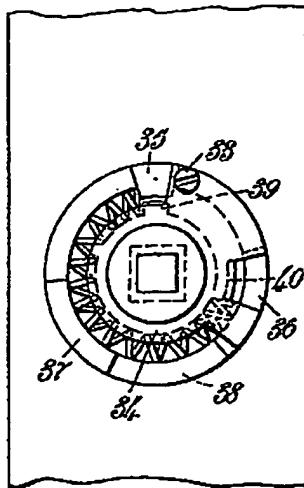
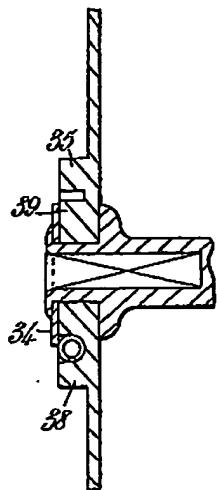


Fig. 8.

Fig. 6.

Fig. 7.

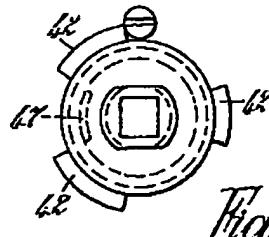
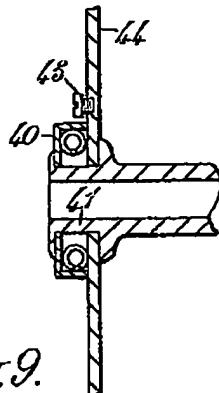


Fig. 10.

Fig. 9.

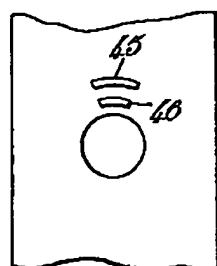


Fig. 11.

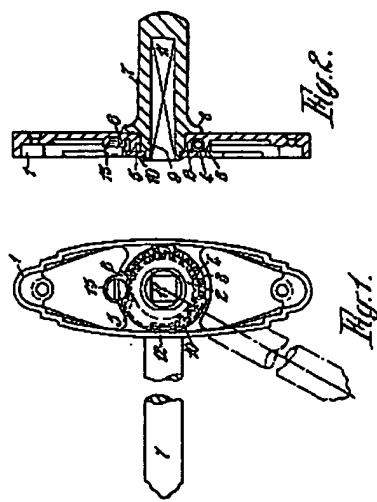


Fig. 1.

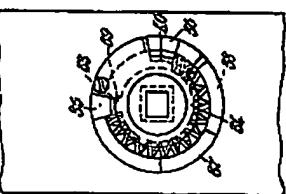


Fig. 2.

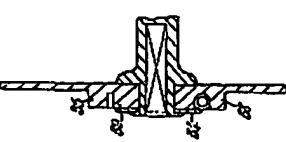


Fig. 3.

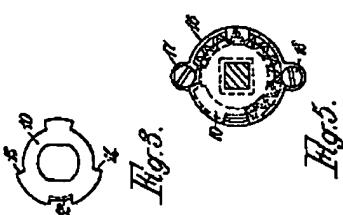


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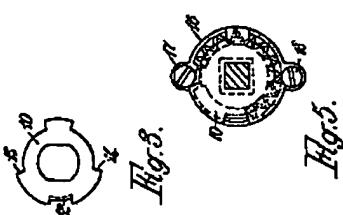


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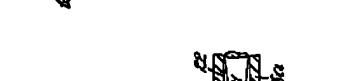


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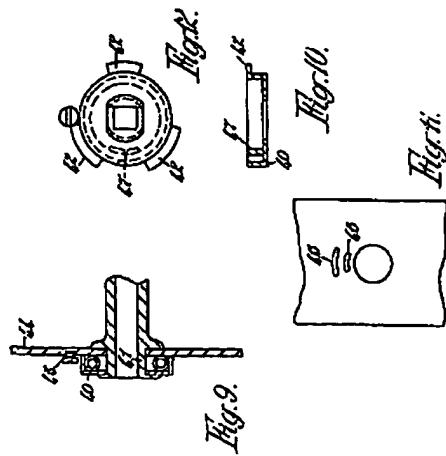


Fig. 7.

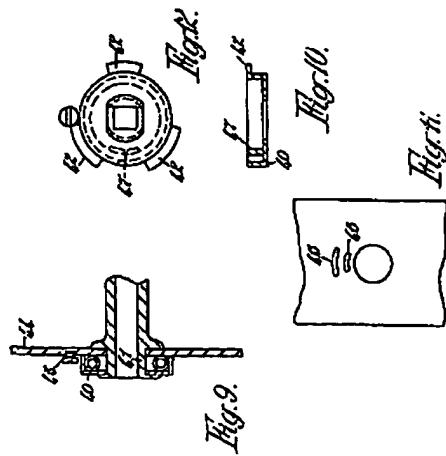


Fig. 8.

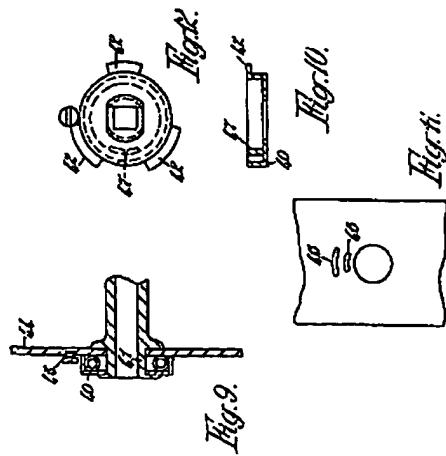


Fig. 9.

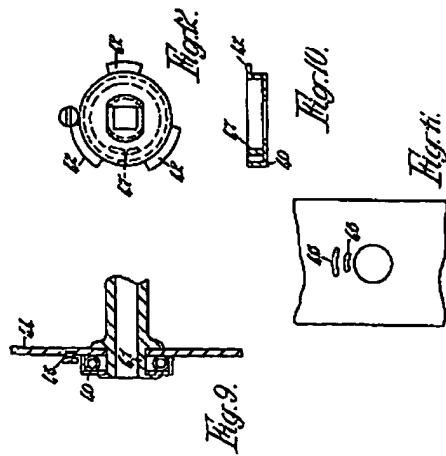


Fig. 10.

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